Dugan-MY16 User Guide

Automatic Mixing Controller Card

for Yamaha Digital Mixers

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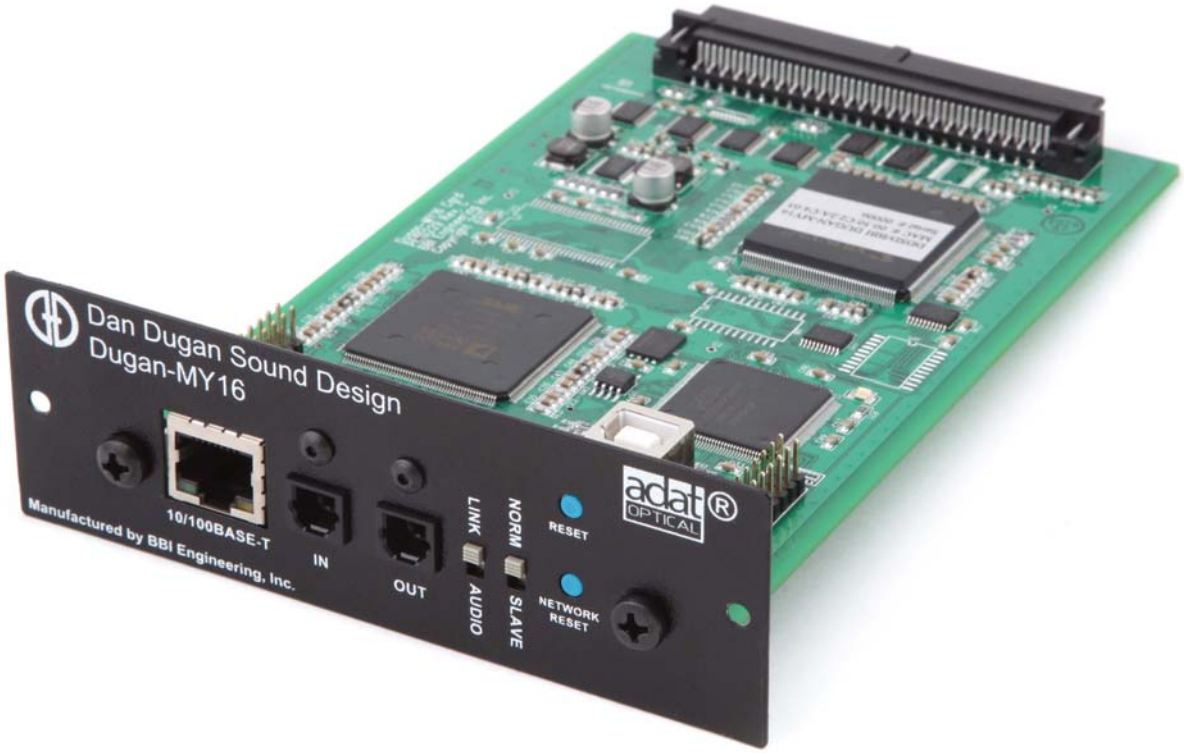
Author	Rob Wenig



Dan Dugan Sound Design
290 Napoleon St., San Francisco, CA 94124
Phone: (415) 821-9776 Fax: (415) 826-7699

Important Safety Instructions and Warnings

The Dugan-MY16's circuitry is made in the USA and meets applicable national safety standards.

Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. **WARNING!** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
7. Clean only with dry cloth.
8. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
9. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
10. Only use attachments/accessories specified by the manufacturer.
11. Unplug this apparatus during lightning storms or when unused for long periods of time.
12. **WARNING!** Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
13. **WARNING!** No user serviceable parts inside.

FCC

1. ***IMPORTANT NOTICE***: *DO NOT MODIFY THIS UNIT!* This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Dan Dugan Sound Design may void your authority, granted by the FCC, to use the product.

2. ***IMPORTANT***: When connecting this product to accessories and/or another product use only high quality shielded cables. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. ***NOTE***: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations.

   If this product is found to be the source of interference, which can be determined by turning the host unit OFF and ON, please try to eliminate the problem by using one of the following measures: Relocate either this product or the device that is being affected by the interference. Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/ s. In the case of radio or TV interference, relocate/ reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable. If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Dan Dugan Sound Design.

The above statements apply ONLY to those products manufactured by Dan Dugan Sound Design.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

- AND -

2. This device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus complies with Canadian ICES-003.

Precautions

Failure to observe the following warnings may lead to fatality or serious injury from fire or electric shock.

1. Before installing the card, you must refer to the owner's manual of the host device or to the Yamaha website ("Guidance on the use of Mini-YGDAI cards" page) to verify that your host device supports this card, and to verify the number of cards that can be installed in combination with other Yamaha or third-party cards.Yamaha website: http://www.yamahaproaudio.com/
2. If one or more cards in a combination not endorsed by Yamaha are installed in a Yamaha device, electrical shock, fire, or malfunction may occur. Please note that the Dugan-MY16 can be used with the following models of Yamaha product that accept option I/O cards (Yamaha MY series and third-party products): PM5D/PM5D-RH, DSP5D, M7CL-48ES, M7CL-48, M7CL-32, LS9-32, LS9-16, DM2000, DM1000, 02R96, 01V96, DME64N, DME24N, CL1, CL3, CL5.
3. To use the Dugan-MY16 card in a DM2000 or 02R96, the following system software is required: DM2000 Version 1.14 or later. 02R96 Version 1.06 or later. See the Yamaha Web site for upgrade information.
4. Do not attempt to disassemble or modify the card. Do not apply excessive force to board connectors or other board components. Mishandling the board may lead to shock, fire hazard, or equipment failure.
5. To eliminate shock hazard, disconnect the power cable from the main unit before installing this card.

CAUTION: *Failure to observe the following precautions may lead to personal injury, or may result in damage to equipment or other property.*

---

6. Do not touch the board's metallic leads (pins) when handling the card. Pins are sharp and may cause hand cuts.
7. The card is electrostatic-sensitive. Before handling the card, you should briefly touch the main unit's metal casing with your bare hand to drain any static charge from your body.

CAUTION: *Dan Dugan Sound Design assumes no responsibility for data loss, equipment damage, or injury caused by inappropriate handling or usage.*

Warranty Statement

Dan Dugan Sound Design warrants that Dugan-MY16 hardware will be free from defects in components and workmanship for a period of 12 months from the date of invoice.

During the warranty period, Dan Dugan Sound Design will cover the cost of all parts and labor to remedy the defect, or replace products which prove to be defective.

Dan Dugan Sound Design is not obliged to honor this warranty if the hardware has failed to be maintained and operated as specified by Dan Dugan Sound Design, in the accompanying documentation, or other than in accordance with industry standards. Defects caused by unauthorized modifications, misuse, negligence, act of God or accident are not covered by this warranty.

Software is provided as a convenience, but due to the wide variety of computer systems, cannot be guaranteed to work. This Limited Warranty is exclusive and no other warranty is expressed or implied. Dan Dugan Sound Design does not warrant that Dan Dugan Sound Design software, or any third-party software, is error free.

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Chapter 1: Introduction

The Dugan-MY16 is a 16-channel automatic mixing controller that plugs into a slot on Yamaha digital mixers. This multichannel audio signal processor patches into the Yamaha's mic channel insert points. The MY16 detects which mics are being used, and makes fast, transparent crossfades. This eliminates late upcuts, reduces system noise and feedback, and lets the engineer focus on balance and sound quality.

The Dugan-MY16 enhances a diverse group of live applications that require multiple mics:

- Conference reinforcement, video trucks
- Houses of worship
- Film and television dialogue, reality shows
- Theater
- Boardrooms, civic meetings, community TV
- Teleconferencing and distance learning

The Dugan-MY16 is operated from the Dugan Control Panel for Java (included). The Dugan Control Panel for iPad (sold separately) performs the same function on an iPad.

Theory of Operation

The Dugan-MY16 uses the Dugan Speech System™, a patented and trademarked automatic mixing function that distributes the gain of one open microphone over the entire system. This results in a natural one-mic ambience with minimal noise or feedback. *The Dugan Speech System does not limit, compress, or control levels*. It performs just one critical function: cuing multiple live mics in situations with unpredictable dialogue. It is essential to distinguish this behavior from the distracting fluctuation of levels and uneven ambience produced by a conventional noise gate.

When one person talks at a time, the Dugan Speech System rapidly fades that mic's gain up and the others down. When the speaker pauses, that mic fades down and the others up, so the gain of all mics sums to equal that of one mic at full gain. When the next person talks, the system fades that mic's gain up and the others down. The result sounds like passing one mic among several speakers.

When several people talk at once, the gain is shared among active mics. All mics sound normal when used but there is no change in ambience, noise buildup, or feedback.

While people are talking, use the Yamaha mixer's faders to set appropriate relative levels for each mic channel. You can leave the faders up when the mics are not used because the Dugan Speech System cues the mics up when needed.

Figure 1-1 shows four snapshots of the Dugan Speech System in action with three mics.

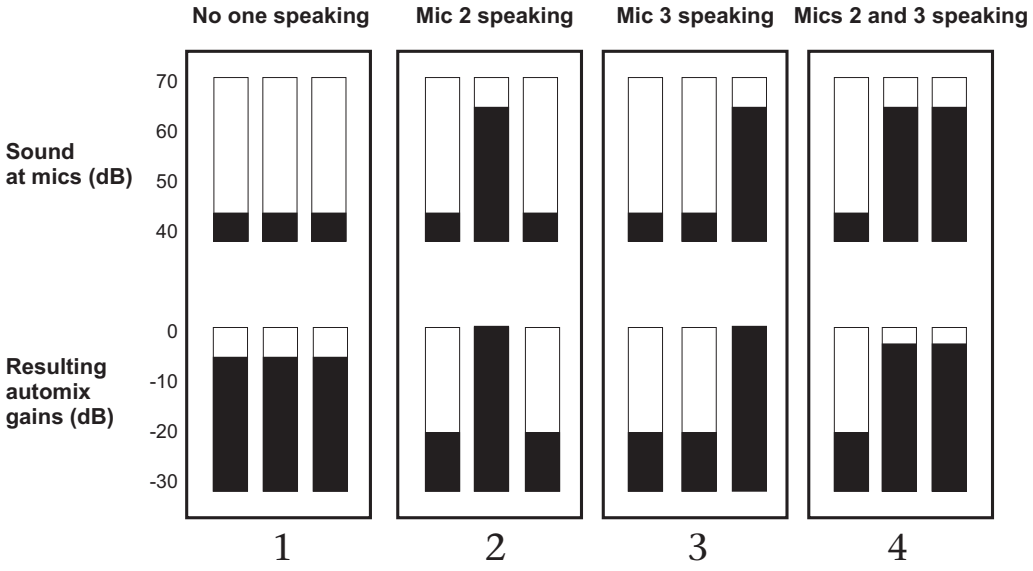

Figure 1-1 Dugan Speech System

Frame 1: No one is speaking and the sound levels at all mics are low. The system fades all channels to a medium gain that sums to one mic at full gain.

Frame 2: One person speaks alone. The system automatically fades their gain to full, and turns the other two inputs down.

Frame 3: The first person finishes speaking and a second person begins. The system automatically fades the new speaker's input gain to full, and turns the other two down.

Frame 4: Two people speak simultaneously. The system automatically shares the gain between them, and turns the other input down.

Remote Control and Software

Two Java applets are included on a thumb drive or CD, or can be downloaded from our website:

- The Dugan Control Panel offers expanded operational capabilities (see Chapter 3: *The Dugan Control Panel*).
- The Dugan Utility helps you connect to a network and update the firmware (see Chapter 4: *Updates*).

The Dugan-MY16 can be controlled with:

- the Dugan Control Panel for Java (included);
- the Dugan Control Panel for iPad (sold separately)
- ASCII commands via Ethernet (contact Dan for information).

Subscribe to the *duganusers* Yahoo group to be notified when updates are available.

Chapter 2: Installation and Linking

This chapter explains how to:

- Install Dugan-MY16 card(s);
- Install the Dugan Control Panel for Dugan-MY16 cards and external Dugans;
- Link Dugan-MY16 cards and external Dugans into a single unified automatic mixing controller.

Installing the Dugan-MY16 Card

The Dugan MY-16 is compatible with a wide range of Yamaha mixers (see table below). Most Yamaha mixers have multiple slots, each of which has 16 channels. The Dugan-MY16 can be installed in any available slot.

To begin installing your Dugan-MY16, first find your mixer model in the table below, and set the Native–Legacy switch accordingly. The Native–Legacy switch maintains Yamaha's compatibility with its older mixers. Some older Yamaha mixers that require the Legacy setting do not display the correct names for plug-in cards in their insert patching screen.

Yamaha Mixer Model	Native-Legacy Switch
CL1	Legacy
CL3	Legacy
CL5	Legacy
PM5D/PM5D-RH	Native
DSP5D	Native
M7CL-48ES	Legacy
M7CL-48	Legacy
M7CL-32	Legacy
LS9-32*	Legacy
LS9-16*	Legacy
DM2000	Legacy
DM1000	Legacy
02R96	Legacy
01V96	Legacy
DME64N	Native
DME24N	Native

With LS9 firmware v1.21 or earlier, the LS9 insert patch points are pre-fader only. To properly mute mixer channels, you must use the Dugan Control Panel for Java (included) or the Dugan Control Panel for iPad (sold separately).

Choose an Operating Mode

The operating mode determines sample rate, linking, and channel count. Set the Yamaha mixer's sample rate before setting the operating mode (see your Yamaha mixer's user guide to learn how).

Choose one of the three operating modes:

Standard

Sixteen Dugan mixing channels at 44.1 or 48 kHz

ADAT I/O connectors can link multiple Dugan units

High-rate

Eight Dugan mixing channels at 88.2 or 96 kHz

ADAT I/O connectors can link multiple Dugan units

Shared

Eight Dugan mixing channels at 44.1 or 48 kHz

The ADAT I/O connectors serve as a general-purpose interface that is available for patching on channels 9–16 of the Dugan-MY16's slot. These channels are unrelated to Dugan mixing and can be used as additional Yamaha mixer I/O.

To use channels 9–16 (as with any digital input), an appropriate synchronization source must be selected (see your Yamaha mixer's user guide).

To configure and install the Dugan-MY16 card:

1. Set the **48 kHz–96 kHz** sample rate switch according the table below.

	Mixer Sample Rate	Sample Rate Switch	LINK-AUDIO Switch
Standard	44.1 kHz	48 kHz	LINK
	48 kHz	48 kHz	LINK
High Rate	88.2 kHz	96 kHz	LINK
	96 kHz	96 kHz	LINK
Shared	44.1 kHz	48 kHz	AUDIO
	48 kHz	48 kHz	AUDIO

The sample rate switch represents *low* (44.1 or 48 kHz) and *high* (88.2 or 96 kHz) settings, respectively, that must correspond to your mixer's current sample rate.

For example,

If your mixer is set to 44.1 kHz, use the **48 kHz** position.

If your mixer is set to 88.2 kHz, use the **96 kHz** position.

Figure 2-1 Circuit board and rear panel switches

2. Install the Dugan-MY16 card according to the instructions in your mixer's user guide.
3. Turn on the mixer.

   If you are using Shared mode, an appropriate synchronization source must be selected for channels 9–16. See your Yamaha mixer's user guide for details.
4. Press and hold the **RESET** button for 3 seconds to restore the Dugan-MY16's factory default settings.
5. Set the rear panel **LINK–AUDIO** switch to the position corresponding to the selected operating mode (see table above).
6. Set the **NORM–SLAVE** switch to **NORM** (up) for unlinked operation.

7. Use your mixer's channel select button to select the first mixer channel in which to insert the Dugan-MY16.

   Refer to your Yamaha mixer user guide to display the insert patching screen.

   Legacy mixers will identify the card on the insert patching screen as either **MY16AT** or **MY8AE96**.

8. Insert the Dugan-MY16 as a post-fader insert on this mic channel.

NOTE: *LS9 mixers with firmware version 1.2 and older do not allow post-fader inserts. You must either update the LS9's firmware, use the Dugan Control Panel for Java (included), or the Dugan Control Panel for iPad (sold separately).*

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9. Repeat steps 7 and 8 for each additional mixer mic channel in which you wish to insert the Dugan-MY16.

No further configuration is required to operate the Dugan-MY16. We designed nominal settings that work fine out of the box, which comes in handy if you are pressed for time before an event. However, to take full advantage of the Dugan-MY16's advanced features, we recommend installing the Dugan Control Panel software.

Connecting to a Computer or Network

To connect to a computer or network, attach a CAT5 cable to the rear panel **10/100BASE-T** connector. Older PCs may require a crossover cable.

We strongly recommend that Windows users turn the Windows firewall off. The Windows Firewall blocks port 9776 used by the Dugan software to communicate. If you must leave the Windows firewall on, either open this port or use the workaround described in *Connecting when Windows Firewall is On* on page 21.

We recommend turning off the computer's WiFi during this process because it sometimes interferes. You can turn it back on after the connection has been established.

To set a specific IP address, proceed to *Software Configuration for a Specific IP Address*.

Two Java applets are provided with the Dugan-MY16:

- The Dugan Control Panel offers expanded operational capabilities.
- The Dugan Utility helps you connect to a network and update the firmware.

Insert the USB thumb drive or CD supplied with the Dugan-MY16, or download the latest version from:

http://www.dandugan.com/downloads

- OR -

http://tech.groups.yahoo.com/group/duganusers/files/

Establishing Network Connections

iPad

We recommend completing your network connection with a computer before using the iPad app.

1. Launch **Dugan-Utility-yyyymmdd.jar**.

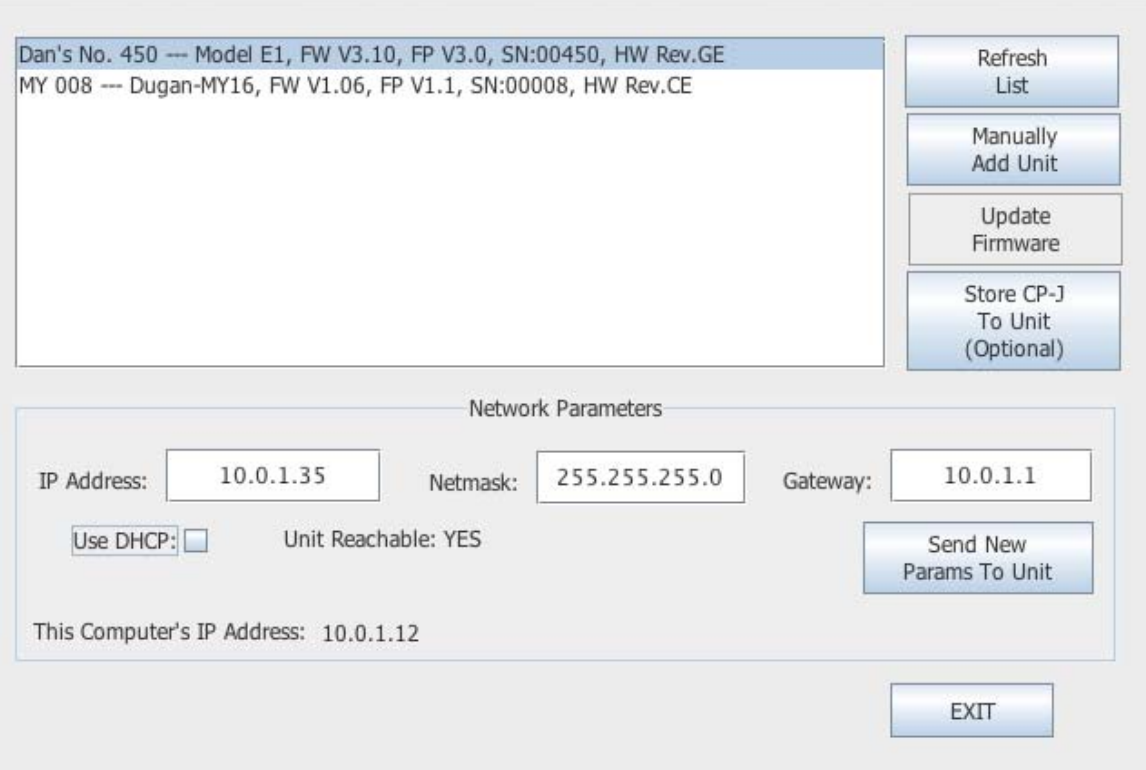
Dan's No. 450 --- Model E1, FW V3.10, FP V3.0, SN:00450, HW Rev.GE
MY 008 --- Dugan-MY16, FW V1.06, FP V1.1, SN:00008, HW Rev.CE
Refresh List
Manually Add Unit
Update Firmware
Store CP-J To Unit (Optional)
Network Parameters
IP Address: 10.0.1.35
Netmask: 255.255.255.0
Gateway: 10.0.1.1
Use DHCP:
Unit Reachable: YES
Send New Params To Unit
This Computer's IP Address: 10.0.1.12
EXIT

Figure 2-2 Dugan Utility

2. Wait a minute and if the list pane is blank, click **Refresh List**.

   If the list pane remains blank, proceed to *Manually Add Unit* below.

   If the list pane displays Dugan units, continue.

3. Click on the first unit in the list so it is highlighted.

   The Network Parameters section displays information about that unit.

   If **Unit Reachable** is **YES**, you are ready to use the Dugan Control Panel with that unit. If you have additional Dugan units to connect, select the next unit in the list and repeat this step. If you are finished with installation, proceed to Chapter 4: *Dugan Control Panel*.

   If **Unit Reachable** is **NO**, proceed.

4. Press and hold the rear panel **NETWORK RESET** button for 3 seconds.

   This resets the following network parameters to their factory default value.

IP Address	192.168.1.xx*
Netmask	255.255.255.0
Gateway	192.168.1.254
DHCP	off

***xx =** last two digits of serial number, unless 00, then use 100

5. Click **Refresh List**.
6. Click on the first unit in the list so it is highlighted.

   If **Unit Reachable** is **YES**, you are ready to use the Dugan Control Panel with that unit. If you have additional Dugan units to connect, select the next unit in the list and repeat Step 3. If you are finished with installation, proceed to Chapter 4: *Dugan Control Panel*.

   If **Unit Reachable** is **NO**, proceed to the next step.
7. Select the **Use DHCP** parameter.
8. Click **Send New Params to Unit**.
9. Highlight the unit in the list pane again.

   If **Unit Reachable** is **YES**, this unit is ready to use with the Dugan Control Panel. If you have additional Dugan units to connect, select the next unit in the list and repeat Step 3. If you are finished with installation, proceed to Chapter 4: *Dugan Control Panel*.

   If **Unit Reachable** is **NO**, proceed to the next step.
10. Copy **This Computer's IP Address** to the **IP Address** field, and increase the value in the last (fourth) group by one.

    For example, if **This Computer's IP Address** is 192.168.1.101, set **IP Address** to 192.168.1.102.
11. Click **Send New Params to Unit**.
12. Highlight the unit in the list pane again.

    If **Unit Reachable** is **YES**, this unit is ready to use with the Dugan Control Panel. If you have additional Dugan units to connect, select the next unit in the list and repeat Step 3. If you are finished with installation, proceed to Chapter 4: *Dugan Control Panel*.

    If **Unit Reachable** is **NO**, see *Using the Internally Stored Dugan Control Panel* on page 19.

Manually Add Unit

If the Dugan unit does not appear in the Dugan Utility list pane, you can manually add the unit:

1. Hold down **NETWORK RESET** for three seconds.

   This performs a network reset.
2. Click **Manually Add Unit**.
3. Enter the default IP address: 192.168.1.xx

   xx = last two digits of serial number, unless they are 00, in which case enter 100.
4. Click OK to exit the dialog.
5. Click **Refresh List**.

   If the list pane is still blank, see *Using the Internally Stored Dugan Control Panel* below.

Using the Internally Stored Dugan Control Panel

Normally, the Dugan Control Panel is run from the **Dugan-Control-Panel-*vxxx*.jar** file. However, if for any reason you do not have that file or an Internet connection, you can run the Dugan Control Panel from a copy stored in the unit (see Chapter 4: *Updates*).

iPad *It is not currently possible to run the internally stored Dugan Control Panel from an iPad.*

To run the internally stored Dugan Control Panel:

1. Launch your browser.
2. Enter the IP Address of the unit.
3. If you do not know its IP Address, press and hold the rear panel **NETWORK RESET** button for 3 seconds.

   The IP Address is set to 192.168.1.*xx* (*xx* = last two digits of the unit's serial number, unless 00, then use 100).
4. Since the Top Pane will be empty, open a separate browser tab for each unit you wish to operate, and enter its IP Address.

If this does not work, consult the *duganusers* Yahoo group (http://tech.groups.yahoo.com/group/duganusers) or contact Dan.

Software Configuration for a Specific IP Address

This section explains to users with IT expertise how to set a specific IP address for any Dugan unit on the network.

1. Launch **Dugan-Utility-vxx.jar**.

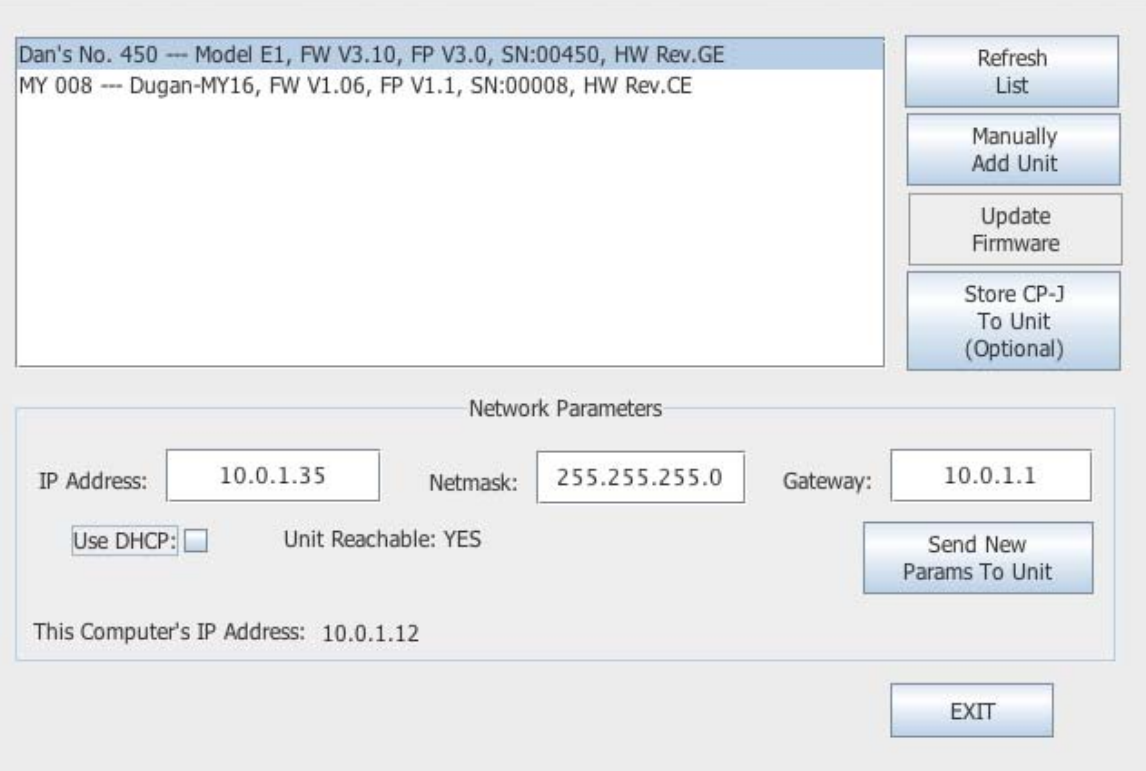

Figure 2-3 Dugan Utility

2. Wait a minute and if the list pane is blank, click **Refresh List**.
   If the list pane remains blank, skip back to *Manually Add Unit* above.
   If the list pane displays Dugan units, continue.
3. Click on the first unit in the list so it is highlighted.
   The Network Parameters section displays information about that unit.
4. If **Use DHCP** is selected, de-select it.
5. Enter the desired IP address into the **IP Address** field.
6. Click **Send New Params to Unit**.
   The Dugan-MY16 will reboot.

Connecting when Windows Firewall is On

The Windows Firewall blocks access to port 9776 that is used by the Dugan software. If you must leave the Windows Firewall on, you can operate the Dugan Control Panel in a browser window with one connected unit per tab.

1. Enter the Dugan-MY16's IP address directly in the browser's address field.

   The browser uses the Dugan Control Panel that is stored in the Model E-1A's hardware, not the version that you may have downloaded to your computer.

   The unit will not show up in the Top Pane but the control panel will still work.

2. If you have multiple Dugan units, create a browser tab for each one and enter its IP Address.
3. Switch tabs to control different units.

Linking Multiple Dugans

Up to eight Dugan units can be linked into a single automatic mixing system. One unit must be set to be the master and the others slaves.

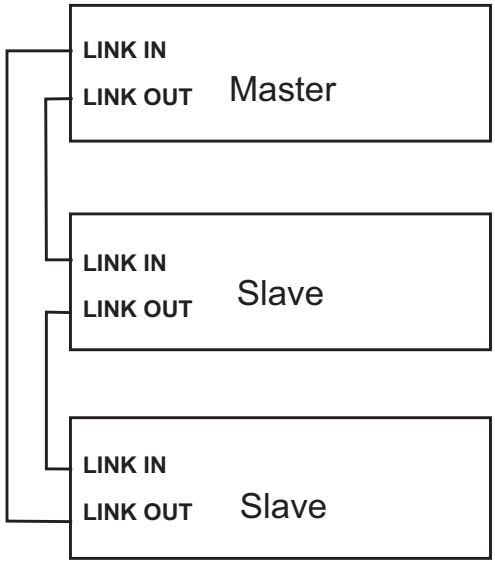

Figure 2-4 Linking multiple Dugans

1. Designate one unit as the master by setting the **NORM-SLAVE** switch on the rear panel to **NORM** (up).
2. Designate any other units as slaves by setting their **NORM-SLAVE** switches on the rear panel to **SLAVE** (down).
3. Use ADAT (Toslink) cables to link units in a ring network (see above).

   Note that all **LINK IN** and **OUT** connectors are used to create the ring.

Chapter 3: The Dugan Control Panel

The Dugan Control Panel has both Java and iPad versions. This chapter discusses the Java version and notes the iPad app's few differences.

The Dugan Control Panel has three panes. The controls displayed in these panes depend on which Dugan device is selected in the Top Pane. This chapter assumes the Dugan-MY16 is selected.

The Dugan Control Panel is divided into three panes:

Top Pane	icons for all connected Dugan units
Channel Pane	**man, auto, mute, preset, override, group, weight**, **bypass,** and channel name controls
Master Pane	**OVERRIDE, PRESET, MUTE, meters, system**, and **reset** controls

Figure 3-1 Dugan Control Panel

Top Pane

The Top Pane displays all connected Dugan units. The active unit is enclosed by a yellow rectangle. Click on another unit to select it and deselect the previous unit.

Figure 3-2 Top Pane

Some Yamaha mixers have multiple card slots that can be used for additional Dugan-MY16s.

All connected Dugan units appear in the Top Pane. If all connected units do not appear in the Top Pane, see *Establishing Network Connections* on page 17.

To display a unit's IP address, hover the mouse over the unit's name.

iPad *To display a unit's IP address, touch and hold the unit's name.*

Add Units Manually

To add a unit manually with a known IP address, click the **+** sign at the right of the Top Pane and enter the IP address in the dialog that appears.

To add a unit manually without a known IP address:

1. Hold down the blue **NETWORK RESET** button on the rear panel for 3 seconds.
2. Click the **+** sign at the right of the Top Pane.
3. Enter the default IP address: 192.168.1.xx
   xx = last two digits of serial number, unless they are 00, in which case enter 100.
4. Click **OK** to exit the dialog.

To display a unit's IP address, hover the mouse over the unit's name.

Select Units to Display

The Dugan-MY16 is set up by default to find all available units connected to the network automatically. Some facilities have multiple studios on the same network that operate independently. In that case, you may want to restrict the units shown in the Top Pane to those in your studio. To do this:

1. Hover the mouse cursor over the names of the units that you want to display, and note their IP addresses.
2. Ctrl-click on the **+** sign at the right of the Top Pane.

   The **+** sign turns red.
3. Quit and relaunch the Dugan Control Panel.

   It opens with **Auto Detect Disabled** in the Top Pane
4. Click on the red **+** sign, and enter the IP address of the first unit you want to add.
5. Repeat step 4 until your units all appear in the Top Pane.

Manually added units must also be removed manually. To remove manually added units from the Top Pane, shift-click on the **+** sign. A dialog appears to confirm that they have been removed.

To restore automatic detection, ctrl-click on the **+** sign, which turns white.

Setting Controls

Controls can be adjusted five ways:

- Enter a dB value in the numeric field.
- Drag in the numeric field (not on iPad).

When a slider is present:

- Drag the slider up or down.
- Click in the slider track to raise or lower the value by 0.5 dB.
- Ctrl-click anywhere on the slider to reset its value to 0 (touch and hold on iPad).

Naming Units and Channels

Connected units are displayed in the top pane in alphabetical order. To display them in your own order, use names with number prefixes.

To name a unit and its channels:

1. Select a unit in the top pane.
2. Select the yellow text in the right pane (under the Dugan logo) and type a name.
3. Press the Enter key on the keyboard to set the name.
4. To name a channel, select the yellow text and type a name.
5. Press the Enter key on the keyboard to set the name.

Channel naming is cleared by pressing **reset** (see page 36).

When the unit is powered up, channel modes are determined by their preset modes; all other settings are retained.

After configuring settings with the Dugan Control Panel, it can be disconnected. All settings are retained and the unit continues to function on its own.

Channel Pane

The Channel Pane contains the controls and indicators for each channel. Channels are always in one of three modes: **man**, **auto**, or **mute**. The active channel mode illuminates. All transitions are made with a smooth, rapid fade. Select a channel mode by pressing the individual mode buttons or the Master **PRESET** button.

Figure 3-3 shows a typical system: channels 1–4 in **auto** with ambient noise, and channels 5–8 in **mute**.

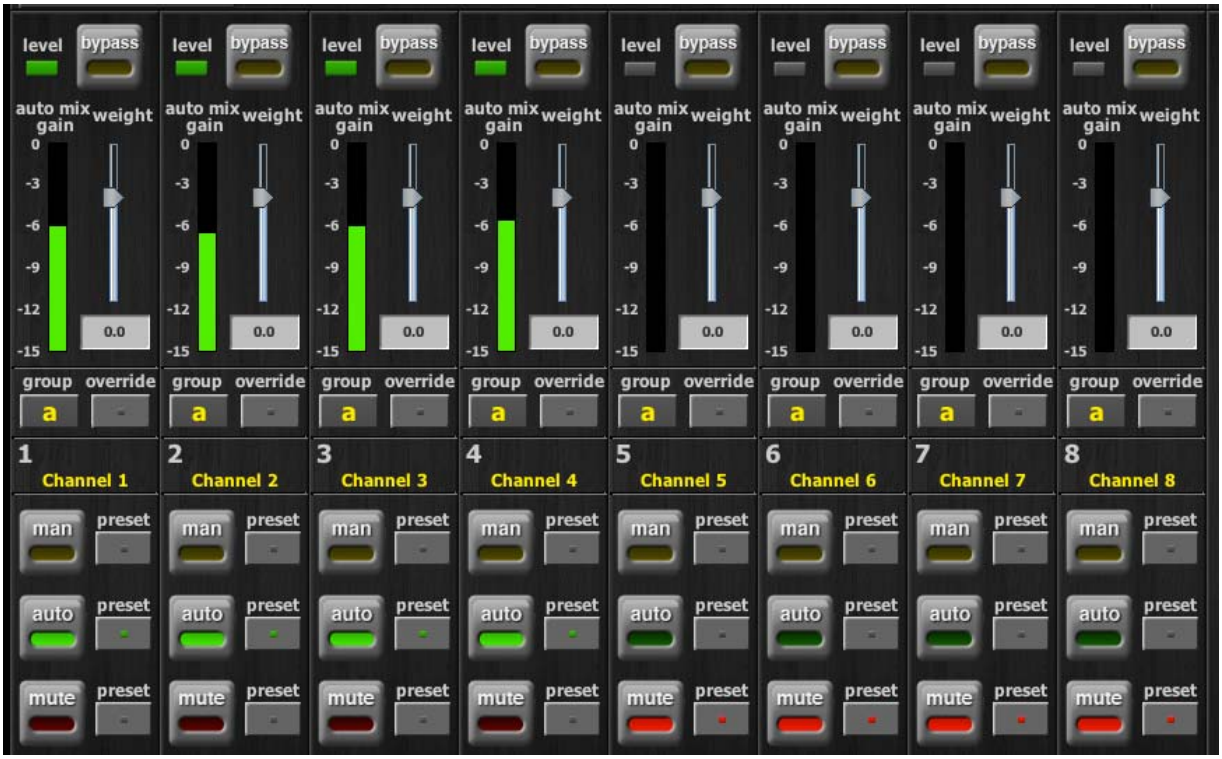

Figure 3-3 Channel Pane

Level Indicator

Each channel has a **level** LED that lights green when the audio level is adequate for automatic mixing. It should remain green when no one is talking.

- If the **level** indicator blinks, raise the Yamaha mixer's input gain.
- If the **level** LED lights red, lower the Yamaha mixer's input gain until it stays green at all times.

Bypass

When **bypass** is active, the signal passes through without automixing. That channel appears inactive, with all lights extinguished.

Figure 3-4 bypass button lit

To deactivate **bypass**, you can:

- Click **bypass** again;

  - OR -

- Click any of the three channel mode buttons.

Channel Modes

Man

Changing channel modes initiates a half-second fade to the new mode. Like radio buttons, you can only choose one mode at a time.

Figure 3-5 Channel modes

In **man** mode there is no automixing, and the signal passes through at unity gain.

Man and **bypass** modes perform similar functions, but we recommend using **man** during live mixing to prevent clicks.

Auto

This is the normal Dugan automixing mode.

Mute

The channel is muted when **mute** is active.

Preset

Use the preset function to store your favorite channel mode settings, which may be restored by pressing the Master **PRESET** button. When the unit powers up, the channels default to their preset modes.

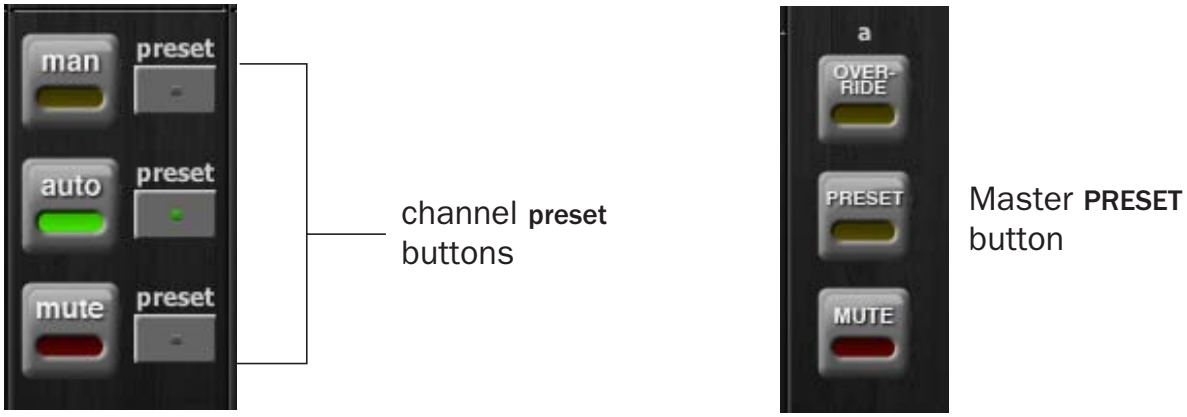

Figure 3-6 Channel **preset** (left) and Master **PRESET** (right) buttons

To set channel presets:

1. Click the channel **preset** button next to the desired channel mode button.
2. For all unused channels, click the **preset** button next to the **mute** button.

The preset indicators should mirror your normal working combination of input modes. The normal condition can then be restored by pressing the Master **PRESET** button.

Channel Groups

Each channel can be assigned to one group: a, b, or c. Each group functions as a separate, independent automatic mixer that can span multiple linked Dugans.

Applications where groups are helpful include:

- **Separate Rooms**: Assign the mics in each room to different groups so they function as separate automatic mixers.
- **Stereo Panning**: Assign the mics panned left, right, and center to groups a, b, and c, respectively, to maintain a stable stereo ambience.

To assign a channel to a group, click the **group** button until the desired group letter appears. The channel strip background is tinted green (**group b**) or blue (**group c**); **group a** is not tinted (Figure 3-7). A set of **OVERRIDE**, **PRESET**, and **MUTE** buttons appears in the Master Pane for each group.

Figure 3-7 Channel groups

Channel Override

Override can be used to instantly mute all mics except one (the host or chairperson). However, any number of mics can be included in the override group.

To assign channels to an override group, activate the **override** button on each channel.

Pressing the Master **OVERRIDE** button puts channels with their **override** buttons lit into **man** mode. All other channels are muted. Press the **OVERRIDE** button again to restore normal automixing operation.

Meters

The meters have three display modes.

	Meter Displays	Meter Color
auto mix gain	action of the Dugan Speech System	green
input	input level	yellow
output	output level	blue

Table 3-1 Meter modes

The default meter display is **auto mix gain**. This is the most useful choice during normal operation; the input and output meters are only used when setting or checking levels.

Click on the Master **meters** button to toggle through the three meter display modes.

Weight

The **weight** controls set the side-chain levels for each channel into the control system. This establishes the relative sensitivity of the automatic mix for the channels in use. *They do not change the mix levels*. When the **weight** controls are balanced, each mic has an equal opportunity to take over the system: when one person talks into one mic, he/she gets all the **auto mix gain** and the others get turned down.

Figure 3-8 Weight controls

The **weight** controls should be used to balance the channel **auto mix gain** indicators when no one is talking. If a board preamp trimmer is turned down, that channel's **weight** control can be turned up to re-balance the automixing, and vice-versa. Weights can be changed by dragging the sliders or by entering dB values in the windows below the sliders. Ctrl-click the **weight** slider to reset its value to 0.

iPad *Touch and hold the **weight** slider to reset its value to 0.*

It is important to understand that the Speech System works by detecting the *ratios* of the levels between channels, not their absolute levels. *The* **weight** *control is not a gate threshold!*

The following example explains how **weight** works (see Figure 3-9).

Raising the **weight** control for one channel:

- increases that channel's **auto mix gain** display during ambience and decreases it slightly for the others;
- makes it more difficult for others to speak when someone speaks into the channel with the higher **weight** setting.

It is important to understand that this does not set that mic's *level* in the mix when that person speaks alone, but only its *sensitivity* during automatic mixing compared to other channels.

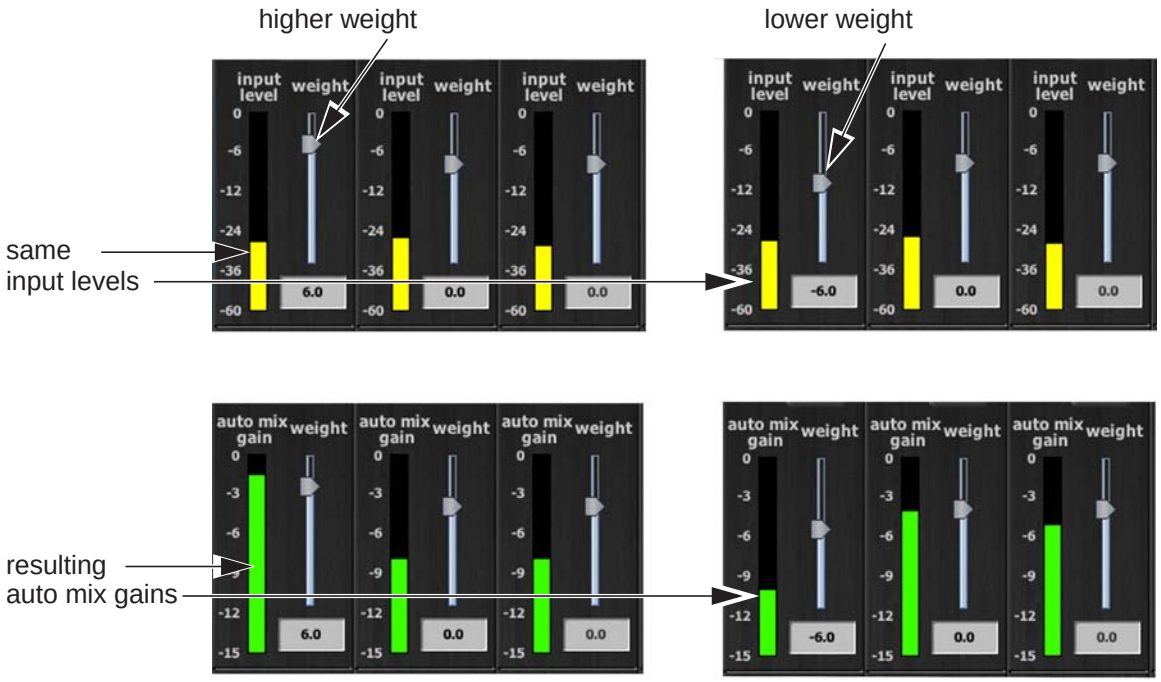

Figure 3-9 Changing one channel's weight control

Lowering the **weight** control for one channel:

- decreases the **auto mix gain** display during ambience for that channel and increases it slightly for the others;
- makes it more difficult for that channel's talker to be heard over the others.

For optimal performance, balance the **weight** controls so the channel gains display approximately equally when no one is talking. If there is ongoing noise near one mic (e.g., computer fan or air vent), suppress it by reducing that channel's **weight**. Of course, you will hear that noise increase when that talker speaks.

Figure 3-10 shows eight- and four-mic systems with appropriate **auto mix gain** displays when no one is talking.

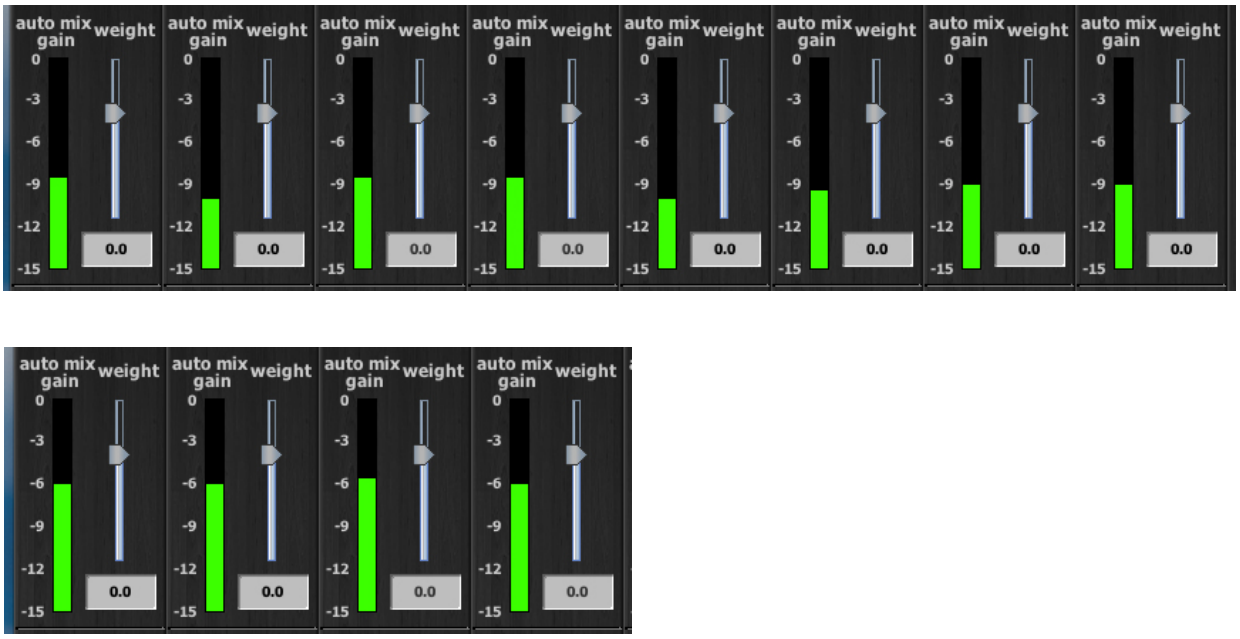

Figure 3-10 Multiple mic ambience: **auto mix gain** hovers around -9 dB for eight mics, -6 dB for four mics

Master Pane

The content of the Master Pane changes to reflect the Dugan device selected. This section documents the Dugan-MY16's controls and indicators.

The selected unit's firmware and Control Panel (Java or iPad) versions are shown below the Dugan logo.

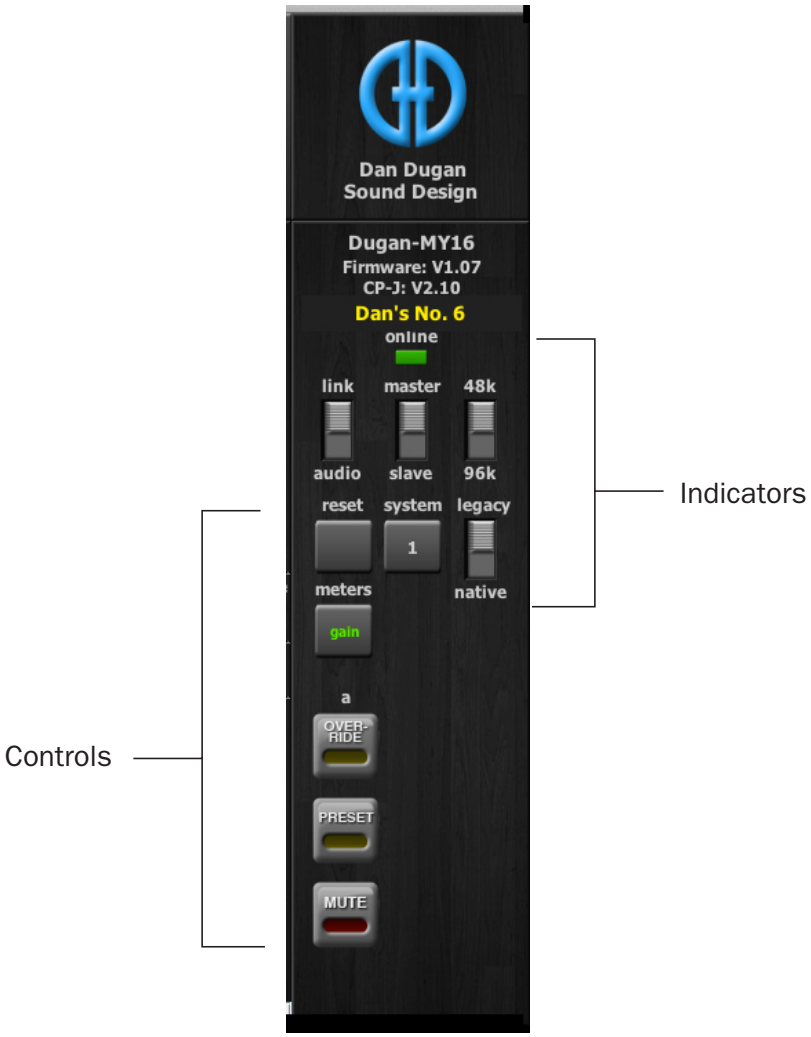

Figure 3-11 Master Pane indicators and controls

Indicators

The Master Pane includes several indicators that do not change any function. See *Choose an Operating Mode* on page 14 to learn how the switches are set on the card.

Online

This indicator lights to show the unit is online.

Master-slave

This indicates whether this unit is set to **NORM (master)** or **SLAVE** mode on the rear panel switch.

- A single Dugan-MY16 must be set to **master**.
- If multiple Dugans are linked, set only one to **master** and the others to **slave**.
- If external Dugan automatic mixing controllers are linked with one or more Dugan-MY16s, one of the Dugan-MY16s must be set to **master**.

48k-96k

This indicates whether this unit is set to low (44.1 or 48 kHz) or high (88.2 or 96 kHz) sample rate on the circuit board switch.

Link-audio

This indicates the operating mode selected on the rear panel switch.

Native-legacy

This indicates whether this device is set to native or legacy mode on the circuit board switch. This allows Yamaha to maintain compatibility with its older mixers.

NOTE: *After all controls have been set, the Dugan Control Panel can be disconnected. The Dugan-MY16 remembers all settings, even after the power is turned off.*

Controls

The Master controls, located on the far right, include **reset**, **system**, **meters**, **OVERRIDE**, **PRESET**, and **MUTE**. A set of buttons appears for each active group.

Reset

Press the **reset** button to restore the Dugan-MY16 to factory default settings. This is the same as pressing the rear panel **RESET** button. This sets

- channel modes and presets to **auto**
- **override** buttons to inactive
- weights to 0 dB
- groups to **a**
- **bypass** buttons to inactive
- channel names to defaults
- meters mode to **gain**

System

When multiple Dugan *units* are linked, groups a, b, and c span linked units and operate as independent automatic mixers.

It is possible to have multiple *systems* of linked units on your network. These units will all appear in the Top Pane. The Dugan-MY16 allows 16 systems in a network.

In the rare instance that requires multiple systems:

1. Select the first unit to include in the system by clicking it in the Top Pane.
2. Click the **system** button and select a unique number for that system.
3. Repeat for each unit in that physically linked system, making sure to use the same number for each unit in the system.
4. Repeat steps 1–3 for each system.

Meters

Click on the Master **meters** button to toggle through the three meter display modes.

	Meter Displays	Meter Color
auto mix gain	action of the Dugan Speech System	green
input	input level	yellow
output	output level	blue

Table 3-2 Meter modes

Group Master Modes

A set of group master mode buttons appears in the Master Pane for each group in use.

Override

Activating the Master **OVERRIDE** button has the following effect on individual channels:

- Channel **override** button active: puts the channel in **man** mode with full gain (no automixing);

  - OR -

- Channel **override** button inactive: mutes the channel.

Select channel(s) to include in the override group by activating their **override** button(s).

Remove channel(s) from the override group by deactivating their **override** button(s).

Preset

Pressing the Master **PRESET** button sets the channel modes (**man**, **auto**, **mute**) to those shown on each channel's **preset** buttons. Use these settings to store your favorite channel mode settings. When the unit powers up, the channels default to their preset modes.

Mute

Press the **MUTE** button to mute a group. Press it again to unmute the group.

Typical Operation

This section creates a setup that will work for most applications.

1. Activate the **auto** mode buttons for all live mic channels.

   The figure below shows channels 1–4 in **auto** mode.

2. Activate the **mute** buttons for all unused channels.

   The figure below shows channels 5–8 in **mute** mode.

Figure 3-12 Typical operation

3. Activate the **preset** button next to the active mode button on each channel.

   This causes that mode to be selected when the system restarts.

4. Initially, set the mixer's faders to unity gain.

5. Speak into each mic normally at the desired distance from the mic. Increase the mixer's input gain to just below clipping for best automatic mixing performance.

   The input gain to the Dugan-MY16 should be high enough keep the **level** LED lit green during silences.

   If the input gain controls are set too low, the inputs drop below the minimum operating level, and the smooth ambience is disrupted.

6. Adjust each live mic channel's **weight** setting until the fluctuating ambient noise registers approximately equally on all **auto mix gain** meters.

   Note that raising one channel's **weight** setting causes its **auto mix gain** to rise and the others to fall. With balanced **weight** settings, all mics have equal access to the system gain.

7. During the event, adjust the faders to refine your mix.

   There is usually no need to adjust the Dugan-MY16's controls during the event.

   Since the Dugan Speech System manages gain, there is no need to mute live mic channels (on the mixer or Dugan-MY16) unless there is disturbing noise.

NOTE: *If channel clipping occurs, turn down its input gain on the Yamaha console, and increase the channel's weight setting on the Dugan to re-establish the ambient noise balance.*

Muting Mics on an LS9

If you have an LS9 mixer with firmware V1.21, or earlier, it does not allow post-fader inserts. You must use the Dugan Control Panel to operate with the Dugan-MY16.

Mics must be muted by using the Dugan's **mute** buttons. Pulling a fader down on the console will not properly mute a channel. Although that mic is no longer audible in the mix, it still contributes to the automatic mixing gain computations, and causes ambient noise fluctuation. At worst, a noise at this mic could cut off another speaker.

To properly mute a channel:

- Leave the console faders up, adjust levels while people are talking, and mute a mic by pressing the Dugan's **mute** mode button. Enable the mic when needed by activating the **auto** button. You can use the Master **PRESET** button as a panic button to unmute all mics.

  Muting mics does not alter the overall ambient sound mix: the Speech System compensates by slightly raising the ambient gains of the other mics to compensate for the gain subtracted by muting a mic.

  - OR -

- Use the **bypass** button with the console fader pulled down. This keeps the mic instantly available on the fader but removes that mic from automatic mixing.

Chapter 4: Updates

Updates for the Dugan-MY16 can be downloaded.

iPad

To update the firmware in your Dugan unit, iPad users must connect a computer and run the Dugan Utility.

To update the Dugan Control Panel for iPad, connect to the Apple App Store.

To update your device's software and firmware:

1. Connect to the Internet and download **Dugan-Software-*yyyymmdd*.zip** from:

   http://www.dandugan.com/downloads/

   - OR -

   http://tech.groups.yahoo.com/group/duganusers/files/

   After the download is complete, the Internet connection is no longer necessary.
2. Unzip the software package.

   It contains the **Dugan-Control-Panel-*vxxx*.jar** and **Dugan-Utility-*yyyymmdd*.jar**. The Dugan Utility contains the latest versions of both the firmware and the safety copy of the Dugan Control Panel that loads automatically into the unit.

   To revert to a previous version, use the older version of the Dugan Utility.
3. Connect the computer to the Dugan units you wish to update.
4. Launch **Dugan-Utility-*yyyymmdd*.jar**.

   The Dugan Utility window appears.

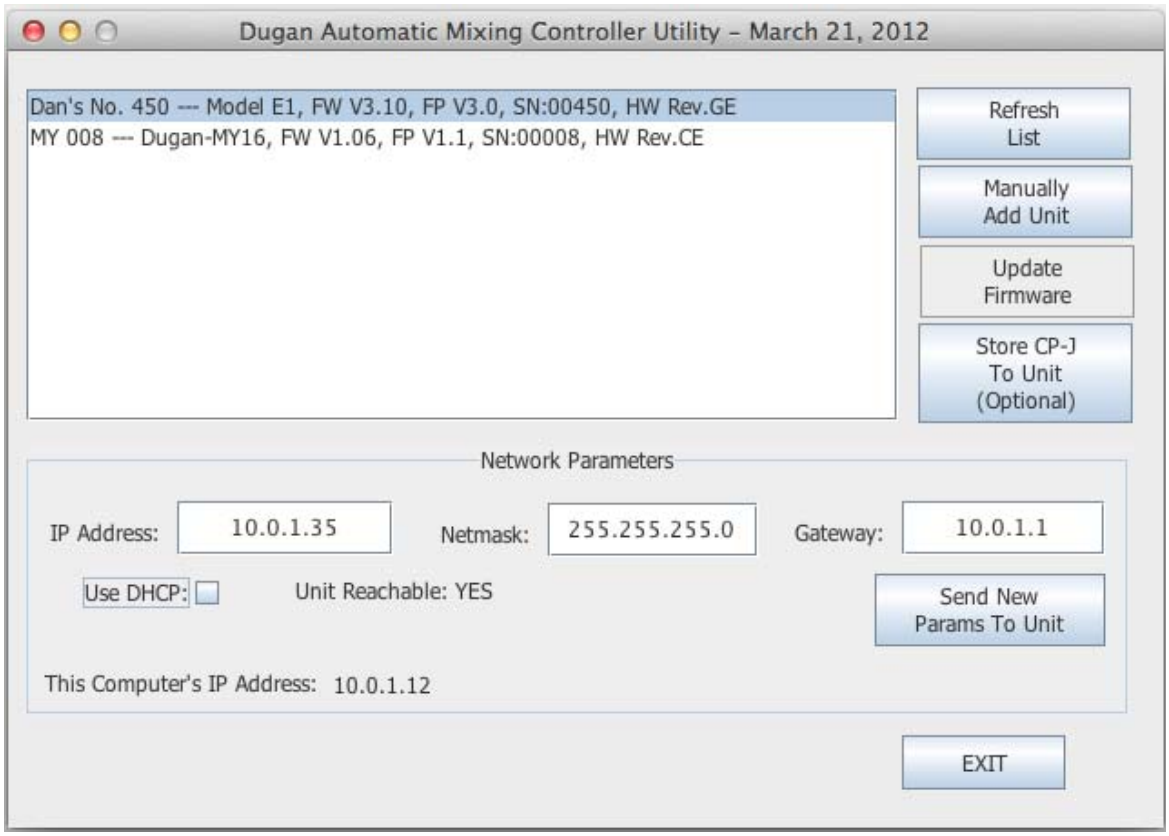
Dugan Automatic Mixing Controller Utility – March 21, 2012
Dan's No. 450 --- Model E1, FW V3.10, FP V3.0, SN:00450, HW Rev.GE
MY 008 --- Dugan-MY16, FW V1.06, FP V1.1, SN:00008, HW Rev.CE
Refresh List
Manually Add Unit
Update Firmware
Store CP-J To Unit (Optional)
Network Parameters
IP Address: 10.0.1.35
Netmask: 255.255.255.0
Gateway: 10.0.1.1
Use DHCP:
Unit Reachable: YES
Send New Params To Unit
This Computer's IP Address: 10.0.1.12
EXIT

Figure 4-1 Dugan Utility

If you do not see the Dugan unit(s) on your network in the list, see *Establishing Network Connections* on page 17.

5. Select the unit to update from the list and click **Update Firmware**.

   The unit reboots after the update completes.

NOTE: *To force an update when the **Update Firmware** button is not blue, Ctrl-click the button.*

Chapter 5: Specifications

Operating Modes	
Standard	16 channels of Dugan mixing at 44.1 or 48 kHz ADAT connectors link multiple Dugan units
High-rate	8 channels of Dugan mixing at 88.2 or 96 kHz ADAT connectors link multiple Dugan units
Shared	8 channels of Dugan mixing and 8 channels of general purpose ADAT I/O
Digital I/O	ADAT optical, 24 bit, 44.1/48 kHz (Shared mode only)
Gain	Unity
Audio Latency	0.2 ms
Linking	Up to 8 Dugan units may be linked in an optical ring network
Connectors	
10/100 BASE T	RJ-45
Linking and Digital I/O	ADAT optical
Compatible Yamaha Mixers	PM5D/PM5D-RH, DSP5D, M7CL, LS9, DM2000, DM1000, 02R96, 01V96, DME64N, DME24N, CL1, CL3, CL5
Dimensions	**H** = 4.0 cm (1.57 in) **W** = 12.0 cm (4.72 in) **D** = 17.6 cm (6.91 in)
Weight	160 g (5.6 oz) 0.6 kg (1 lb 5 oz) in shipping box